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Support Networks Within the Family as a Public Good Problem

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SUPPORT NETWORKS WITHIN THE FAMILY AS A PUBLIC GOOD PROBLEM

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Abstract. This paper examines altruism and exchange models of familial relationships. It first examines the predictions of these models when there are more than two family members, demonstrating that altruism with multiple altruists is similar to the classic public good model. The paper also examines predictions of the altruism model under the assumption that the child acts strategically. It is traditionally assumed that parents unilaterally determine the amount of assistance they provide to their child. However, if one allows strategic behavior by the child, the classic prediction of complete neutralization of redistributive policies does not hold. Empirical analyses do not overwhelmingly support either of the two models; other motivations are likely to be important.

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SUPPORT NETWORKS WITHIN THE FAMILY AS A PUBLIC GOOD PROBLEM

I. INTRODUCTION

The classic public good problem leads to inefficient outcomes with under provision of the public good. But in some cases it appears that private provision is made at high levels, higher than might be predicted by the pure public good model. Different theories have been developed to explain this behavior. One factor that has been identified is group size; smaller groups may be able to overcome the public good problem and provide a more efficient level of output. The group which is probably most likely to succeed in overcoming the public good problem is the family. The family typically has a relatively small number of members, relatively extensive information about its group members, and it interacts over time.

In this paper I analyze an altruism model of family behavior in which there are multiple altruists. Parents and parents-in-law are the altruists, and they give assistance to their adult children. This model can be interpreted as a public good model where the public good for the parents is the well-being of an adult child (and that child's spouse). This model suggests the possibility of inefficient outcomes within the extended family as a result of free-riding behavior on the part of parents. I then analyze the effects of group size (i.e., number of parents) and the income of recipients on donations to public goods (i.e., well-being of children) to derive predictions of this model. Emphasis is given to the effects of small changes in group size. I then empirically test the predictions of the model in the context of monetary transfers from parents and parents-in-law to their adult children.

In addition to an altruism model with multiple altruists, an exchange model similar to Cox's (1987) is analyzed. The primary extension to Cox's (1987) model is the incorporation of multiple parents. This modification allows for additional empirically testable predictions between the altruism model and the exchange model.

The paper proceeds as follows. Section II presents the two models--altruism with multiple altruists and exchange with multiple parents. Section III discusses the data. Section IV discusses the estimation strategy, and the results are presented in Section V. A final section summarizes.

II. TWO COMPETING MODELS OF FAMILIAL TRANSFERS

In this section I examine an altruism model of family support in the case where there are multiple altruists, i.e., multiple parents. Allowing for multiple parents leads to a public good model of support within the extended family. Here the public good is the well-being of the adult child. In addition, I investigate an exchange model of family behavior; this model has been the most widely studied alternative to altruism. The altruism and exchange models lead to several testable predictions, three of which differ across the two models.

Altruism with Multiple Altruists

In the altruism model parents give children money because they care about the utility of the child. Explicitly:

$$U_j^p = U^p\left(X_j^p, V^k\left(X^k\right)\right) \quad j=1,\ldots N \tag{1}$$

$$E_j^p = F_j + X_j^p \qquad j = 1,\ldots N \tag{2}$$

The utility of the k^{th} child's j^{th} parent depends on that parent's consumption of private goods, X_j^p, and that parent's "consumption" of the child's well-being, V^k. Furthermore, the child is only concerned with her own consumption of the private good; she does not (operatively) feel altruistic toward her parents. A child (and her spouse) can have as many as four parent-households, where a parent-household consists of a parent of the respondent, and, if married, that parent's spouse. For example, a respondent whose parents are both alive and married to each other, and whose spouse's parents are both alive and divorced, that respondent would have three

parent-households. Therefore, $0 \leq N \leq 4$. Throughout I will use the terms parents and parent-households interchangeably.[1]

The child's budget constraint is determined by her own earnings, E^k, and the total amount of transfers she receives from all parents.

$$E^k + \sum_{j=1}^{N^k} F_j = X^k \tag{3}$$

To complete the model, parents are assumed to act in a way consistent with Nash behavior; they take as given the amount transferred to the child by all other parents. The child is assumed to be completely passive in the determination of transfer amounts. This assumption will eventually be relaxed. In addition, it is assumed that parents cannot take money away from the child, i.e. $F_j \geq 0$.

For now, assume there is one parent and one child and an interior solution, i.e., that parents make positive transfers to children. The parent's maximization problem and resulting first order condition are, respectively:

$$\max_F \; U^p\left(E_p - F, V^k\left(E_k + F\right)\right) \tag{4}$$

$$-U_x^p + U_v^p V_x^k = 0 \tag{5}$$

where U_x^p and U_v^p are the derivatives of parent's utility with respect to own consumption and the child's well-being, respectively, and V_x^k is the derivative of the child's utility with respect to the child's consumption. We want to analyze predictions of the model and, therefore, several comparative statics are derived.

Effects of Child's Income

Totally differentiating (5) yields:

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[1]Note that the model assumes a single child. The model may be extended to more than one child. Furthermore, the theoretical models do not examine the dynamics within each of the parent and child households, although the empirical analyses address this dimension.

$$\left[U^p_{xx} - 2U^p_{xv}V^2_x + U^p_{vv}V^2_x + U^p_v V^k_{xx}\right]dF = \left[U^p_{xx} - U^p_{vx}V^k_x\right]dE_p + \left[U^p_{xv}V^k_x - U^p_{vv}V^2_x - U^p_v V^k_{xx}\right]dE_k$$

This leads to the following relationships:

$$\frac{dF}{dE_p} = \frac{\left[U^p_{xx} - U^p_{vx}V^k_x\right]}{\left[U^p_{xx} - 2U^p_{xv}V^k_x + U^p_{vv}V^2_x + U^p_v V^k_{xx}\right]} \tag{6}$$

$$\frac{dF}{dE_k} = \frac{[U^p_{xv}V^k_x - U^p_{vv}V^2_x - U^p_v V^k_{xx}]}{[U^p_{xx} - 2U^p_{xv}V^k_x + U^p_{vv}V^2_x + U^p_v V^k_{xx}]} \tag{7}$$

Thus:

$$\frac{dF}{dE_k} - \frac{dF}{dE_p} = -1 \tag{8}$$

If F is a normal good for the parent, then as the child's income increases, *ceteris paribus*, the amount transferred to the child will decrease (i.e. $dF/dE_k < 0$). This is the common result discussed by Becker (1981), Cox and Rank (1992), and Altonji, Hayashi, and Kotlikoff (1997).

Figure 1 demonstrates this relationship graphically. The indifference curves are those of the parent. As the amount of transfers increases, the utility of the parent increases, but then it eventually decreases because the parent's own consumption is reduced. The parent chooses F_p'. If the child's income rises to E_k'', then the amount transferred will be reduced to, for example, F_p''.

Strategic Altruism

The altruism model has received much criticism because of its assumption of altruistically motivated transfers. But another key assumption of this model is the solution concept. It assumes that the child is completely passive; the child allows the parent to choose the amount of the transfer with the only constraint being that the transfer be positive. The child, however, has some bargaining power that is not recognized by this solution concept. The bargaining power arises because the parent cares about the child; thus, the child can threaten to refuse the transfer -

- refusal would make the parent worse off. With this threat, the child can demand a higher transfer.

To demonstrate, consider the case in which the optimization is done by the child. Thus, the child would maximize her utility subject to her budget constraint and the constraint that the parent is at least as well off participating in the relationship as he would be if he gave no transfers. It is clear that the child will choose a level of transfers greater than the parent. Using Figure 1, the child would choose an amount such as F_k', which would make the parent just indifferent between participating in the transfer relationship and opting out. Furthermore, given the preferences in Figure 1, if the child's income increases to E_k'', then the amount transferred to the child would *increase* to F_k''. Obviously this is a function of the shape of the preferences of the parents.

Using the same utility function and budget constraints as above, I algebraically examine the sensitivity of the relationship between transfers and child's income to the solution concept. In this case, I analyze a symmetric Nash bargaining solution. This solution is found by maximizing the following:

$$\max_F \ [U^p(E_p - F, V^k(E_k + F)) - V^p(E_p)][U^k(E_k + F) - V^k(E_k)]$$

where it is assumed that if the child and parent do not come to an agreement on the amount to be transferred, then no transfers are made and the utilities of the parent and child are $V_p(E_p)$ and $V_k(E_k)$. The first order condition for this model is:

$$[-U_x^p + U_v^p V_x^k][U^k - V^k] + U_x^k[U^p - V^p] = 0 \qquad (9)$$

Totally differentiating (9) leads to:

$$[(U_{xx}^p - U_{xv}^p V_x^k + U_{vv}^p V_x^{k^2} + U_v^p V_{xx}^k)(U^k - V^k) + (-U_x^p + U_v^p V_x^k)U_x^k + U_{xx}^k(U^p - V^p)$$

$$+U_x^k(-U_x^p + U_v^p V_x^k) - U^k V_x^k U_{xv}^p + V^k V_x^k U_{vx}^p]dF$$

$$= [(U^p_{xv}V^k_x - U^p_{vv}V^{k^2}_x - U^p_v V^k_{xx})(U^k - V^k) + (U^p_x - U^p_x V^k_x)(U^k_x - V^k_x)$$

$$-U^k_{xx}(U^p - V^p) - U^k_x(U^p_v V^k_x)]dE_k + [U^p_{xx}(U^k - V^k)$$

$$-U^k_x(U^p_x - V^p_x) - U^k V^k_x U^p_{ux} + V^k V^k_x U^p_{ux}]dE_p \qquad (10)$$

This implies relationships (11) and (12):

$$\frac{dF}{dE_k} = \frac{(U^p_{xv}V^k_x - U^p_{vv}V^{k^2}_x - U^p_v V^k_{xx})(U^k - V^k) + (U^p_x - U^p_v V^k_x)(U^k_x - V^k_x) - U^k_{xx}(U^p - V^p) - U^k_x(U^p_v V^k_x)}{\Phi} \qquad (11)$$

$$\frac{dF}{dE_p} = \frac{U^p_{xx}(U^k - V^k) - U^k_x(U^p_x - V^p_x) - U^k V^k_x U^p_{ux} + V^k V^k_x U^p_{ux}}{\Phi} \qquad (12)$$

where Φ is the term that is multiplied by dF in (10). Rewriting (11) and (12) leads to:

$$\frac{dF}{dE_k} - \frac{dF}{dE_p} = -1 + \frac{V^k_x(U^p_v V^k_x - U^p_x) - U^k_x V^p_x}{\Phi} \qquad (13)$$

But from the first order condition in (9) we know:

$$U^p_v V^k_x - U^p_x = \frac{-U^k_x(U^p - V^p)}{U^k - V^k} \qquad (14)$$

Substituting (14) into (13):

$$\frac{dF}{dE_k} = \frac{dF}{dE_p} - \frac{V^k_x U^k_x \frac{U^p - V^p}{U^k - V^k} + U^k_x V^p_x}{\Phi} - 1 \qquad (15)$$

This is the same relationship that arises when the parent is dominant in the bargaining, i.e., equation (8), except that now there is an additional term. Assuming that there are positive gains to the parent-child relationship for both the parent and the child, $\frac{U^p - V^p}{U^k - V^k}$ will be positive.

Furthermore, it is assumed that $U_i > 0$, $V_i > 0$, $U_{ii} < 0$ and $V_{ii} < 0$, i=c,v, and $U_{xv} > 0$.

Therefore, the sign of the additional term depends on the sign of Φ where:

$$\Phi = (U^p_{xx} - 2U^p_{xv}V^k_x + U^p_{vv}V^{k^2}_x + U^p_v V^k_{xx})(U^k - V^k) + U^k_{xx}(U^p - V^p) + 2U^k_x(U^p_v V^k_x - U^p_x) \qquad (16)$$

Given the assumptions of convexity of the utility functions and positive gains to participating in the relationship for both the parent and child, the first two terms in (16) are negative. The last term is also negative. To demonstrate why, recall that the first order condition for the solution concept in which the parent single-handedly chooses the amount of transfers is $-U_x^p + U_v^p V_x^k = 0$, as expressed in (5). In the Nash solution, transfers are at least as large as in the parent optimization solution. Therefore, relative to the solution in which the parent makes the decision unilaterally, at the Nash solution it must be that U_x^p is larger and that U_v^p and V_x^k are smaller. As a result, $U_x^p > U_v^p V_x^k$. This implies that the last term in (16) is negative. Therefore, offsetting $1 changes in child's and parent's income will not be completely neutralized by changes in the amount of transfers given by the parent to the child. Stated differently, altruism with strategic behavior by children implies that intergenerational redistribution policies will not be completely ineffective. This conclusion is in contrast to the result expressed in (8).

Effects of Group Size

Thus far the analysis has considered the effects of a change in the income of the child. In a model with multiple donors, predictions can also be made about the effects of changes in group size (i.e. number of parents) on donations. Because an adult child may have several parent-households, each caring about the child as described by (1), the well-being of the child can be interpreted as a public good. The satisfaction that one parent-household receives from witnessing his child's happiness does not exclude other parent-households from deriving satisfaction from that child's well-being (i.e., it is non-excludable.)

This model of altruism with multiple parents leads to three additional predictions which are related to theories of the effects of group size on donations to public goods. These theories have been explored by Chamberlain (1974), McGuire (1975), Lam (1986), and Andreoni (1988).

As the number of parent-households changes, transfers to the adult child are altered. Specifically, assuming that the child's well-being is a normal good for the parent, a Nash public good model of support networks within the extended family predicts that as the number of parent-households increases, the probability that a given parent-household makes a transfer to the child will diminish.[2] Also, the amount that any particular parent gives will be reduced. However, as shown by Lam (1986), the introduction of one additional group member causes the *total* amount given to the public good to increase, or stay the same, depending on whether or not the new group member contributes. We will test these predictions below.

Exchange with Multiple Parents

The alternative to the altruism model that has been most widely examined is exchange; transfers of money to an adult child are assumed to entail some type of reciprocity on the part of the child. This reciprocity could be in the form of care-giving or other time-intensive activities. The "service" may also be in the form of altered behavior on the part of the child to conform with parental expectations. In either case, it is assumed that the service does not have a close market substitute.[3] This model has been analyzed by Cox (1987) for the case of a single parent. In the context of multiple parents, the utility functions and budget constraints of the parent-households are:

$$U_j^p = U^p(X_j^p, s_j, V^k(X^k, \sum_{j=1}^{N^k} s_j)) \qquad j = 1,\ldots,N^k \qquad (17)$$

$$E_j^p = X_j^p + P_s * s_j \qquad j = 1,\ldots,N$$

s_j is the amount of services provided by the child to parent-household j, P_S is the price of services, and N^k is the number of parent-households of child k. $F_j=P_S*s_j$ is the amount transferred from parent j to the child. Parents spend all their income on child services and other

[2]In this case, the child is assumed to be passive.

goods, children do not like to provide services to their parents, and children only care about the amount of services provided to all parents. The child's budget constraint is determined by her earnings and the sum of transfers from all parents.

$$X^k = E^k + \sum_{j=1}^{N_k} F_j$$

In addition, it is assumed that parents cannot take money from the child, $F_j \geq 0$.

Effect of Child's Income

Figures 2 and 3 demonstrate the implications of the model. The child can be thought of as supplying a service to the parent. Provision of this service can be represented by a positively sloped supply curve. Parents demand the service from the child. In Figure 2, consider the case of two parents. The demand by parents 1 and 2 are represented by *D1* and *D2*. The total demand faced by the child is *D1+D2*. With child income E_k, the amount of services provided is *S1+S2* at a price of *P*. Parents 1 and 2 will "purchase" *S1* and *S2* amounts of the service, respectively.

The first prediction of the model is the response due to a change in the income of the child. If the child's income increases from, for example, E_k to E_k', the supply curve moves upward and to the left. This shift is due to the fact that the child does not like providing the service to the parent. The new equilibrium is at *S2'* with a price of P'. Thus, we see that parent 1 is no longer making transfers to the child. In addition, the total amount of services rendered has decreased and the price of services has increased. Without additional assumptions regarding the elasticities of supply and demand, it cannot be determined whether the total amount of money transferred increases or decreases. Furthermore, it cannot be determined whether the amount transferred by parent 2 increases or decreases. Thus, the predictions are different than those for the altruism model. As in the altruism model, an increase in the child's income decreases the probability that any given parent makes a transfer to the child. However, unlike the altruism

[3]Services provided by siblings may be a closer substitute. This is explored in the empirical analyses.

model, the total amount received from parents and the amount received from each parent may either rise or fall.

Effects of Group Size

Figure 3 depicts the effects of a change in the number of parent-households under the exchange model. In the case where there are two parents, total demand facing the child is *D1+D2*. Equilibrium total transfers is $S * P$. Now, if a third parent-household is introduced who has demand *D3*, total demand shifts to *D1+ D2+ D3*. The new equilibrium is at a higher price, P', and a higher total quantity exchanged, S'. The exchange model predicts that the total amount of parental transfers will increase as the number of parent-households increases. Also, the probability that a given parent makes a transfer is reduced. In the case depicted in Figure 3, parent 1, who was initially making transfers, does not make transfers after parent 3 enters. However, the amount that a given parent transfers to the child is indeterminate and depends on the elasticities of supply and demand. Recall that the altruism model predicts that the amount given by each parent falls as the number of parents increase.

Comparison of Predictions of the Two Models

Table 1 summarizes the predictions of the altruism and exchange models when there are multiple altruists. These predictions differ for three relationships:

- Child's income and total transfers received from all parents
- Child's income and the amount received from a given parent
- Number of parent-households and the amount received from a given parent

If transfers are motivated by altruism, then all three relationships should be negative. If exchange is the motivating factor, all three are indeterminate. Estimates of these relationships will be presented when the empirical results are given below.

Implications of Each Model

If transfers are given for altruistic reasons, then several conclusions can be drawn. The first has to do with Ricardian Equivalence. A key assumption of the model put forth by Barro (1974), which revived the notion of Ricardian Equivalence, is that generations are altruistically linked. More generally, Bernheim and Bagwell (1988) have shown that with altruism and operative linkages across all families, all government redistribution policy will be undone by private redistribution within the extended family. If transfers are not found to be made altruistically, Barro's claims are weakened. In addition, we have shown that these conclusions are based on the assumption that children play a completely passive role in the redistribution of resources across generations. If this assumption is loosened, altruism per se does not imply complete neutrality.

If transfers are made altruistically, then the well-being of the child can be analyzed as a public good. Thus, with multiple parent-households there may be less than optimal support provided to adult children because of free-riding by parent-households. Ghosh (1988) has analyzed aspects of this model in the context of support to elderly parents. In this setting, siblings provide support to an aging parent for whom they care. "Free-riding" behavior by the altruistic children may lead to under provision of support for the aging parents.

The public good model also has implications for the efficiency of investments in children. If parents invest in children in anticipation of them providing old age support, then the existence of multiple parent-households could lead to inefficient levels of investment. For example, when a parent is deciding how much to invest in a child's education, he has expectations about that child's future earnings and the share of the child's earnings that will be used to support elderly parents. If that child must also support parents-in-law (or divorced parents) who are not present when the education investments are made, then the parent's investment in the child may be suboptimal. This notion may help explain sex differences in schooling investment, which favor males in some countries. If "tradition" has stated that men continue to live with and provide support to their own parents after marriage, then the parent may

then make the efficient level of investment in the male child. This "tradition" may actually be a way to obtain more efficient levels of investment in the male's education.

III. DATA

The 1988 Panel Study of Income Dynamics (PSID) contains information that allows tests of the two models. The data that receive primary attention here come from a supplement to the 1988 PSID that investigates private transfers. The question regarding private parental monetary transfers asks, "During 1987, did (you/your family living there) receive any loans, gifts, or support worth $100 or more from your parents?"[4,5] Furthermore, it asks this question with regard to each of the respondent's parents and parents-in-law who are living elsewhere. There are six different "types" of parents: head's parents who are still married, head's father (and stepmother, if exists), head's mother (and, if exists, stepfather, if exists), spouse's parents who are still married, spouse's father (and stepmother, if exists), and spouse's mother (and stepfather, if exists). Therefore, there are as many as four parent-households.

In addition to the information on private transfers, the family units interviewed by the PSID are asked to provide information about each of the head's parents and, if there is a spouse, each of the spouse's parents. This information includes their annual earnings, net wealth, education, health, distance in miles from respondent's residence, marital status, and living arrangements.

Combined with the information collected annually, the PSID data on private transfers have several advantages over data available from most similar surveys. First, transfers are reported separately with *each* parent-household. Second, demographic and income characteristics of both the adult child respondent and the respondent's parents are available.

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[4]Underscore included in questionnaire.

[5]Throughout the paper the term "family unit" will refer to the nuclear family which consists of the PSID respondent and his/her family living there. Thus, the respondent's parents, children, siblings, or any other

Furthermore, the information about the parents is relatively extensive.[6] Third, transfers received from each of the spouses' parents are collected. Furthermore, characteristics of the spouse's parents are also ascertained.

IV. ESTIMATION STRATEGY

The analysis is restricted to monetary transfers received from parents and parents-in-law by an adult child and his/her spouse who live independently from their parents and who have at least one living parent or parent-in-law. Transfers are most likely to be received from parents; 18 percent of PSID households receive transfers from a parent while just 4 percent receive transfers from someone other than a parent (Table 2). Furthermore, 78 percent of all private transfer dollars received are received from parents. Thus, although the empirical analysis is restricted to parental transfers, our theory describes the majority of monetary transfers that are made.

The models lead to predictions regarding transfers, F_{ij}, received from each parent, j, by child i, as well as total transfers received from all parent-households, $\sum_{j=1}^{N_i} F_{ij}$. Therefore, the following equations will be estimated:

$$F_{ij} = \beta_x' C_i + \beta_p' P_{ij} + \varepsilon_{ij}$$

$$\sum_{j}^{N_i} F_{ij} = \gamma_x' C_i + \gamma_p' \sum_{j}^{N_i} P_{ij} + j\sum_{j}^{N_i} \varepsilon_{ij}$$

where C_i are the characteristics of the adult child, P_{ij} are the characteristics of the parent-household which gave (or could have given) the adult child a transfer, and ε_{ij} is the error which is specified below.

The fact that a large proportion of individuals do not receive private transfers in a given year complicates the analysis in some familiar ways. Behrman, Pollak, and Taubman (1990) and

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relative not living in the respondent's household are not considered to be part of the respondent's "family unit."

Cox and Raines (1985) posited a tobit model of transfers received. They both estimated a negative coefficient for recipient's income in a regression explaining transfers received. However, as predicted by the exchange model presented in Section II, it is possible that the signs on the coefficients for recipient's income in the transfer probability equation and the transfer amount equation are different. Given that the tobit model assumes that the sign of the coefficients in the transfer probability and transfer amounts equations are the same, a less restrictive estimation strategy is needed in order to test this model. Cox (1987) uses a generalized Tobit procedure to estimate the transfer amount equation. In all specifications he estimated a positive coefficient on recipient's income. MacDonald (1990) also estimated transfers received with a two-stage procedure. MacDonald (1990) included several life-course event variables in the model of the probability of transfer receipt that were omitted from the amounts equation.[7] Along with the tobit results of total transfers received, I estimate a probit and least squares regression which includes all the regressors that are included in the probit as well as the inverse Mills ratio.[8] Although relying on functional form for identification through the inverse Mills ratio is problematic, any exclusion restriction is difficult to justify. We will compare the estimates across the tobit and selection-corrected models.

The estimation of transfers from each parent-household, F_{ij}, will parallel that for total transfers from all parent-households, $\sum_{j=1}^{N_i} F_{ij}$. Thus, a tobit, a probit, and a least squares regression including the inverse Mills ratio from the probit are estimated. This analysis will assume that $E(\varepsilon_{ij}\varepsilon_{kl}) = \sigma^2$ for all $i=k$, $j=l$, and 0 otherwise.

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[6]However, it is reported by the adult child.

[7]These variables include whether a family unit had a child, changed marital status, left parent's home, migrated, or had a non-work or non-school experience during the transfer period.

[8]The t-statistics estimated in the two-stage procedure are corrected for heteroscedasticity.

V. RESULTS

Total Transfers Received From All Parents

This section reports the estimates of the models of total transfers received from all parents, $\sum_{j=1}^{N_i} F_{ij}$. I restrict the sample to those respondents who have at least one parent-household alive at the time of the interview. In addition, those respondents who have a parent or parent-in-law living in their household unit are eliminated.[9] This leaves a sample of 4,483 family units.

Twenty percent of this sample received private transfers from parents in 1987. The average parental transfer received for recipients is about $2,000. Table 3 reports descriptive statistics of the explanatory variables as well as the probit, tobit, and selection-corrected least squares estimates.

As mentioned previously, the sign on the coefficient of recipient's income provides one test in determining the motivation of private transfers. The sum of the labor income of the head and labor income of the spouse is used here as the family income measure. Income from these two sources accounts for almost 70 percent of total family unit income. In the probit model the coefficient for this variable is negative and significant, which is consistent with both altruism and exchange. The tobit estimates imply that a $1,000 increase in income reduces the amount of transfers received by a modest $14. In the selection-corrected least squares regression the coefficient estimate is also negative, though it is not precisely estimated. The coefficient estimates are not in contradiction with the altruism model. However, the negative coefficient does not disprove the exchange motivation hypothesis either; the exchange model may be consistent with either a positive or a negative coefficient.

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[9]The 1988 survey reports transfers in 1987. If the head changed between 1987 and 1988, the transfers are those of the head in 1988. If the head in 1988 is not the same head as in 1987, then it would not appropriate to use the information on the 1987 head. Thus, we drop those observations in which the head changed between 1987 and 1988. Including these individuals in the analysis has no substantive effect on the results.

Having additional parent-households increases the probability of receiving transfers and the amount received in total. This result is consistent with the simulation results of the pure public good model given by Andreoni (1988) in which total giving to the public good increases as the number of potential donors increases. It is also consistent with the exchange model.

There are several other estimates in these regression equations that are of interest. The parental controls have the expected effect; the more educated the head's parents the more likely it is that a transfer is received. This may be a direct parental education effect as well as a parental wealth effect. The number of siblings is the total number of living siblings of the head and the spouse of the family unit. Having additional siblings reduces both the probability of receiving a transfer and the amount of transfers received. This effect is significant in both the probit and tobit models. In the exchange model, an increase in the number of siblings could be considered as a shift in the total supply of child services provided to the parent. An alternative theory is that if parents have more than one child they may face competing demands for monetary support.

Becoming divorced or separated in 1987 increased the probability of receiving a transfer in that year, while becoming married decreased the probability. Having young children in the family unit increases the probability of receiving a transfer. In the context of the exchange model, all of these variables can be thought of as altering the supply of services. In addition to the variables discussed above, the age, race and sex of the head of the family unit, and the total number of individuals in the household are also included in the analysis. The probability of receiving a transfer decreases at a decreasing rate as the age of the head increases, and female heads appear to be less likely to receive transfers. Racial differences are also found; family units whose heads are white are more likely to receive, and receive larger transfers.

Transfers Received From Each Parent

I now turn to the analysis of transfers received from each parent-household, F_{ij}. As a result, an adult child and spouse who have three parent-households will have three observations, one for each child/parent-household relationship. This leads to a sample of 6,916 observations. The descriptive statistics and regression estimates are reported in table 4.

As in the analysis of total transfers, the income of the recipient's family unit is negatively related to the probability of receiving a transfer. This is consistent with both altruism and exchange. The tobit estimates imply a negative effect on transfers, similar in magnitude to the estimate in Table 3. In the least squares equation the estimate reverses sign and has a t-statistic of 1.25; this estimate provides some, though limited, evidence in opposition to the altruism model.

Consistent with both the altruism and exchange model predictions, it is estimated that a given parent-household is less likely to make a transfer to a child the greater is the number of other parent-households from whom that child may receive transfers. However, the coefficient estimates on the number of parent-households in the least squares model are positive with a t-statistic of 1.31. This positive (but imprecise) estimate is consistent with the exchange model predictions but not with altruism.

Summarizing the results for altruism versus exchange reported in tables 3 and 4, the evidence is mixed. For the three relationships that differ across models, two of the estimates favor exchange (although they are imprecise) and the third is consistent with either.

There are other interesting results in the regressions in table 4. The recipient's age appears to be related to the probability of receiving a transfer in a similar manner as was found in the regressions reported in table 3; transfer receipt decreases with age but at a decreasing rate. The sex of the head is not important in explaining transfer receipt in these equations. In addition, whether the head is white does not significantly effect the probability of receiving, though it does

have a positive effect on the amount of transfers received as estimated by the two-stage procedure.

Several life-course events are important determinants of transfer receipt. Missing work because of illness, unemployment, or being out of the labor force increases the probability of receiving a transfer. Becoming married decreases the probability of receiving a transfer, though the amount received increases. Finally, there is some evidence that having a young child in the family increases transfer receipt.

Analyzing transfers from each parent, F_{ij}, allows consideration of a much more complete array of variables representing parental characteristics, F_{ij}. The list of parental variables includes net wealth (in categories), education, marital status, age, health, distance to respondent's residence, number of children, and whether it is the male's parent-household. It should be noted, however, that the parents' characteristics are reported by the adult child. Also, if a mother and father are still married, then the parental education, age, and health are those of the father. If they are not still married, then these variables are for the adult child's natural parent. For example, if the respondent's mother has remarried, then the parental education, age, and health are those of the mother, not the stepfather.

The parent's net wealth is significant both in the probit and the tobit models. Moreover, these estimates imply that parental wealth has a relatively large effect on the amount of transfers received by children. Even in the presence of controls for parental net wealth, parental education appears to play some role in determining parental transfers received; those family units with parents with less than 12 years of education are less likely to receive transfers.[10]

There is some evidence that transfers are more likely to be received from married parents. None of the coefficients for the distance to parent's residence are significant, but the coefficient estimates are in the expected direction; the farther away the parent lives the less likely

[10]Note that it could be that parental education is picking up interbracket net wealth effects.

a transfer is received from that parent. With regard to the health of the parent, it is found that the less healthy the parent the less likely a transfer is received from that parent.

The number of living children of the parent-household appears to be important in determining the probability of receiving a transfer from that parent-household. Thus, controlling for parental wealth, children who have a greater number of living siblings are less likely to receive monetary transfers from a given parent. In addition, there is some evidence (although imprecise) that a family unit is more likely to receive a transfer from the female's parent than the male's parent, controlling for the gender of the head of the household and the child's marital status.

VI. SUMMARY AND CONCLUSIONS

Two competing models of familial transfers were investigated. One model is based on the assumption that parents make transfers because of altruistic feelings toward their children. It was shown that the altruism model in the presence of multiple parents can be analyzed as a public good problem where the public good is the well-being of a parent's child and that child's spouse. This model has implications for the efficiency of the level of transfers given by members within the extended family.

Furthermore, the predictions of the altruism model where shown to be sensitive to the solution concept. Under the assumption that parents make unilateral decisions and behave altruistically towards their children, it is well established that if $1 is taken away from the child and given to the parent, parents will simply redistribute their entire income gain to their child. As a result, the initial redistribution of income is completely neutralized. However, if children behave strategically, redistribution policies will not be completely neutralized.

With regard to the motivation for private transfers, the tests put forth in this paper extend previous analyses. Introducing multiple parents allowed two additional tests to be conducted between the altruism and exchange models. Two of the three key estimates were not consistent

with the altruism model (although they were not precisely estimated), while the third was consistent with both.

In addition, this study finds that life-course events such as a recent change in marital status or a birth of a child are significant determinants of private transfer behavior. It also finds that recipients of private parental transfers are younger, more likely to be white, and more likely to be a daughter than a son. In addition, recipients' parents are more educated, wealthier, healthier, and more likely to be married. Recipients' also have a greater number of "parent-households," and fewer siblings.

Finally, these models should also be tested in the context of assistance given by adult children to their elderly parents. It has been claimed that decreases in the number of children will lead to a substantial decline in the receipt of assistance by elderly parents; this is especially prevalent in many developing countries where fertility has declined over the past few decades. However, the public good model suggests that although total transfers received from all children by elderly parents will be reduced if the number of children decreases, the magnitude of this decline may be small because each individual child may give more than they otherwise would.

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Figure 1.

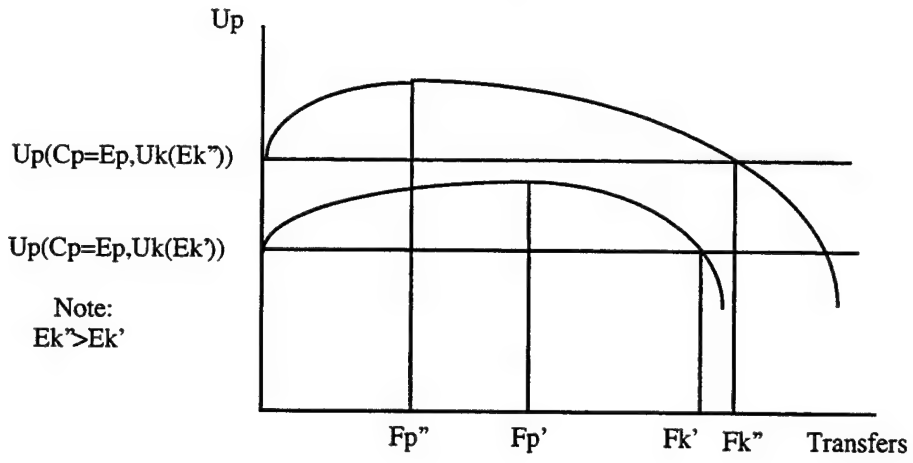

Figure 2.

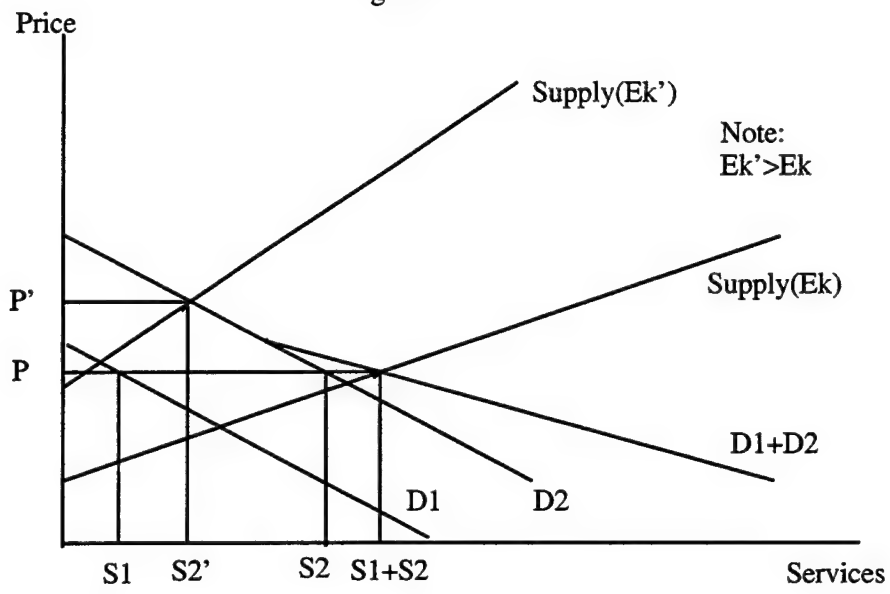
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Figure 3.

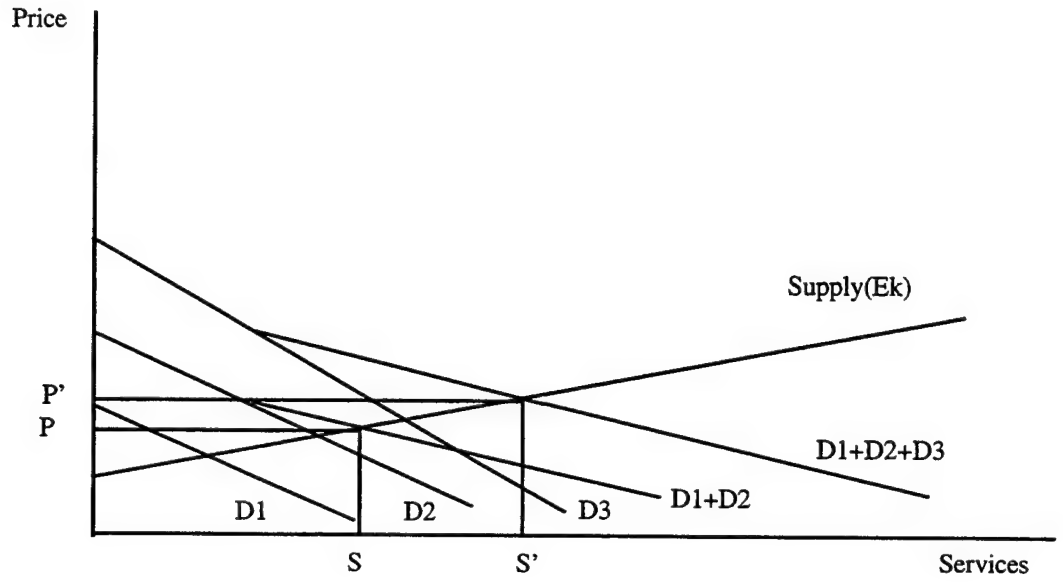

Table 1. Predictions of Altruism and Exchange Models

	Effects of an Increase in Child's Income		Effects of an Increase in Number of Parent-families	
Outcome variable	Altruism	Exchange	Altruism	Exchange
Probability of receiving transfers from a particular parent	(–)	(–)	(–)	(–)
Amount of transfers from all parents: $\sum_{i=1}^{N} F_i$	(–)	indeterminate	non-negative	(+)
Amount received from each parent: F_i	(–)	indeterminate	(–)	indeterminate

Table 2. Cash Transfers Received from Relatives and Nonrelatives
N=7,108

Individual from whom transfer was received	Percent Receiving Transfers	Average Amount Received Among Recipients
Any individual	21.2	$2,037
Parents	17.6	1,919
Children	0.9	552
Siblings	1.7	1,523
Other relatives	1.6	1,803
Nonrelatives	1.8	1,791

The estimates are based on weighted data using the 1988 family weight.

Table 3. Models of Total Transfers Received from All Parents

	Probit		Selection-Corrected Least Squares		Tobit		Unweighted
Explanatory Variable	Beta	t-stat	Beta	t-stat	Beta	t-stat	Mean
Labor income of head and wife*	-0.003	2.83	-6.865	0.23	-14.226	2.16	27,927
Number of parent-families:							
Two	0.204	3.43	1230	0.82	1228	3.72	0.47
Three or more	0.331	4.10	1569	0.67	1790	4.03	0.14
Number of sibs/sibs-in-law alive	-0.024	3.50	-86	0.49	-124	3.19	6.44
Number in family unit	-0.029	1.48	-196	0.85	-158	1.44	2.25
Female head	-0.109	1.54	-452	0.62	-503	1.28	0.20
Head white	0.226	3.86	1743	1.23	1443	4.40	0.64
Age of head	-0.031	1.93	76	0.38	-53	0.59	37.54
Age of head, squared	0.000	0.61	-1	1.14	0	0.43	
Health of head:							
Very good	-0.042	0.75	-987	2.25	-566	1.85	0.34
Good	0.019	0.30	19	0.04	113	0.33	0.26
Fair	-0.046	0.46	-313	0.44	-275	0.49	0.09
Poor	0.038	0.20	102	0.16	117	0.11	0.02
Marital status change of head:							
Widowed	0.465	0.65	2055	0.69	2318	0.59	0.00
Divorced /separated	0.306	1.66	2126	0.86	1981	1.99	0.01
Married	-0.307	1.97	3057	1.00	114	0.14	0.02
Head spent time not working because:							
Illness	0.108	2.28	714	0.96	614	2.36	0.36
On strike	-0.016	0.04	-1064	1.04	-529	0.25	0.00
Unemployed	0.275	4.23	791	0.46	1249	3.53	0.13
Out of labor force	0.240	2.75	318	0.22	924	1.95	0.07
Child <3 years old in family unit	0.146	2.41	738	0.70	811	2.46	0.20
Head's father's education:							
Unknown	-0.279	2.50	-1051	0.55	-1406	2.23	0.08
0-5 years	-0.091	0.71	-500	0.69	-469	0.65	0.06
6-8 years	-0.079	1.15	313	0.44	-155	0.41	0.32
9-11 years	0.041	0.52	449	0.78	377	0.89	0.13
Some college, no BA	-0.050	0.52	-144	0.24	-228	0.43	0.06
BA or RN, and no more	0.190	1.97	861	0.62	1075	2.08	0.06
Advanced training	0.413	3.31	699	0.32	1457	2.25	0.03
Head's mother's education:							
Unknown	0.003	0.02	-504	1.53	-170	0.24	0.06
0-5 years	-0.183	1.13	0	1.34	-1299	1.39	0.04
6-8 years	-0.098	1.29	-516	0.65	-586	1.38	0.21
9-11 years	0.011	0.16	-158	0.47	-69	0.18	0.16
Some college, no BA	0.065	0.74	154	0.25	245	0.52	0.07
BA or RN, and no more	0.104	1.01	221	0.30	351	0.64	0.05
Advanced training	0.279	1.75	2026	1.47	1847	2.24	0.02
Inverse Mills ratio			3920	0.47			
Constant	-0.093	0.31	-6172	-0.88	-4194	2.45	
R^2	-		0.0811		-		
Log-Likelihood	-2019.3		-		-10207.8		
Number of Observations	4,483		910		4,483		
Mean of Dependent Variable	0.203		1,821		370		

*Coefficient estimate for labor income multiplied by 1000. Omitted categories: one parent-family, education of parents 12 years, currently working, never married, excellent health.

Table 4. Models of Transfers Received from Each Parent-Household

Explanatory Variable	Probit		Selection-Corrected Least Squares		Tobit		Unweighted
	Beta	t-stat	Beta	t-stat	Beta	t-stat	Mean
Family Unit Variables (C_i)							
Labor income of head and wife*	-0.004	3.72	35.1	1.25	-17.6	2.99	29,641
Number of parent-families:							
Two	-0.127	2.13	1078	1.38	-443	1.46	0.53
Three or more	-0.106	1.41	834	1.26	-364	0.95	0.24
Female head	0.011	0.14	-188	0.45	67	0.17	0.14
Number in family unit	-0.053	2.89	391	1.10	-245	2.62	3.19
Head white	-0.072	1.32	843	1.82	0	0.78	0.67
Age of head	-0.035	1.99	410	1.80	-78	0.85	36.56
Age squared of head	0.000	0.24	-2	1.54	-1	0.64	
Health of head:							
Very good	-0.017	0.33	-200	0.48	-219	0.86	0.36
Good	0.087	1.51	-446	0.86	461	1.58	0.26
Fair	0.101	1.07	-875	1.06	418	0.87	0.08
Poor	0.099	0.56	-538	0.64	572	0.64	0.02
Marital status change:							
Widowed	0.528	0.69	-5769	1.79	1782	0.46	0.00
Divorced /separated	0.471	2.69	-2538	0.84	2548	2.95	0.01
Married	-0.390	2.84	5844	1.89	-737	1.11	0.03
Head spent time not working because:							
Illness	0.088	2.09	-428	0.66	445	2.08	0.37
On strike	-0.044	0.13	-708	0.74	-613	0.34	0.00
Unemployed	0.247	4.27	-1937	1.33	1077	3.67	0.13
Out of labor force	0.244	3.10	-2082	1.48	919	2.31	0.06
Child <3 years old in family unit	0.091	1.72	-666	0.99	462	1.74	0.22
Parental Variables (Pij)							
Parent's Net Wealth:							
Unknown; refuse to report	0.045	0.49	-103	0.25	313	0.66	0.13
In debt	-0.237	1.84	1851	1.22	-1083	1.60	0.06
$1-24,999	0.386	4.79	-3248	1.37	1678	3.98	0.16
$25,000-99,999	0.489	6.57	-3658	1.20	2382	6.05	0.24
Greater than $100,000	0.833	10.51	-5324	1.11	4186	10.27	0.22
>$25,000 but DK if >$100,000	0.474	3.47	-4079	1.41	2020	2.88	0.03
Parent's education:							
Unknown	-0.124	1.13	914	1.05	-628	1.09	0.05
0-5 years	-0.340	2.52	2130	0.97	-1800	2.53	0.05
6-8 years	-0.214	3.34	1933	1.47	-959	2.95	0.24
9-11 years	0.030	0.48	-189	0.60	100	0.31	0.16
Some college, no BA	0.033	0.45	687	1.00	471	1.26	0.08
BA or RN, and no more	0.185	2.41	-1120	0.94	893	2.36	0.07
Advanced training	0.341	3.35	-1860	0.96	1640	3.33	0.03
Number of parent's children alive	-0.039	5.55	285	1.14	-179	4.98	5.59
Parent married	0.074	1.66	-642	1.25	292	1.28	0.56
Age of parent	-0.015	0.72	137	0.92	-77	0.72	62.43
Age of parent squared	0.000	1.17	-1	0.93	1	1.22	
Parent's health:							
Very good	-0.040	0.62	-407	0.84	-491	1.52	0.22
Good	-0.060	0.98	-38	0.06	-449	1.45	0.33
Fair	-0-112	1.60	-28	0.04	-773	2.20	0.22
Poor	-0.243	2.50	2587	1.69	-1006	0.20	0.10
Distance to parent's residence:							
Unknown	0.172	0.72	-2336	1.77	409	0.33	0.01
Over 100 miles	-0.114	1.60	-56	0.07	-859	2.38	0.31
11-100 miles	-0.067	0.95	368	0.57	-331	0.92	0.25
1-10 miles	-0.042	0.62	177	0.33	-199	0.57	0.31
Whether male's parent-family	-0.073	1.56	455	0.90	-391	1.66	0.50
Inverse Mills ratio			-10362	1.37			
Constant	0.338	0.59	2886	0.59	-1417	0.48	
R^2	-		0.1115		-		
Log-Likelihood	-2460.4		-		-11361.2		
Number of Observations	6,916		1,006		6,916		
Mean of Dependent Variable	0.1455		1,577		229.33		

*Coefficient estimate for labor income multiplied by 1000. Omitted categories: one parent-family, education of parents 12 years, currently working, never married, excellent health, wealth "just break even", less than 1 mile.